DIET AND NUTRITION STATUS

IN

KARNATAKA

NATIONAL NUTRITION MONITORING BUREAU (I.C.M.R)

REPORT

BUREAU OF NUTRITION

DIRECTORATE OF HEALTH & FAMILY WELFARE SERVICES

BANGALORE

WORKSHOP

ON

NUTRITION INTERVENTIONS

IN

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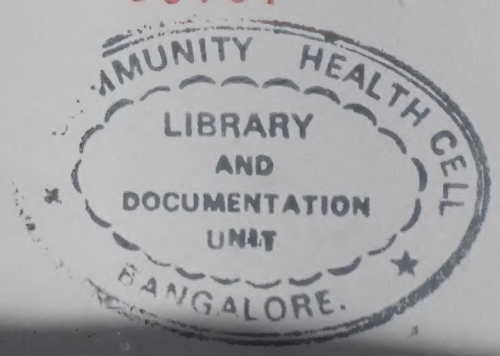

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INTRODUCTION

The Karnataka unit of National Nutrition Monitoring Bureau (ICMR) under the technical supervision of National Institute of Nutrition, Hyderabad and functioning in the Directorate of Health and Family Welfare Services, Bangalore has been collecting data on the dietary and Nutritional status of population in Karnataka.

All the 19 districts (presently 20) in Karnataka were initially covered during 1975 to 1980 under rural survey and urban survey was conducted in Bangalore and Mysore cities. Second round of rural surveys are currently going on.

The sampling design, coverage protocols and training of the personnel are given by National Institute of Nutrition, Hyderabad. The team consisting of a Medical Officer, a Nutritionist and other para Medical Staff collect the data on standardized proforma using scientific instruments. The data is analysed by National Institute of Nutrition, Hyderabad and presented as Annual Reports of the NNMB.

In this Report, the information on the Dietary and Nutritional status collected during the first round of survey in rural and urban Karnataka during 1975 to 1982 by the NNMB team is presented.

In every district, almost all the Taluks are covered for the survey and from the selected villages (as per N N M B Sampling procedure), the sample is drawn from different socioeconomic groups like Harijans, Artisans, small farmers and labourers, medium and Big farmers so that the sample gives the true representation of the community.

Intake of Food Stuffs
(Table-I)

Cereals and Millets : -

Rice, Jowar and Ragi form the major cereal and millets consumed in Karnataka. Jowar is mainly consumed in North Karnataka while Ragi is mainly consumed in central and South Karnataka areas. In costal districts and the Malnad(Forest) areas, Rice is the main food item. The average consumption of cereals and millets perday per C.U. was of the order of 655 gms, ranging from 418 gm in Dakshina Kannada district where Rice is the staple diet to 780 gms in Bijapur and Dharwar districts where Jowar is the staple diet. The recommended intake in balanced diet is 460 gms per C.U. perday.

Pulses:

The average pulse consumption is high in the pulse growing areas of Bidar, Raichur and Gulbarga districts varying between 85 to 92 gm, Pulse consumption is low in the Malnad districts of Dakshina Kannada, Uttara Kannada and Coorg districts varying between 17 gm to 38 gm, The average consumption for all the districts was 52 gm per C.U. perday which is above the recommended intake of 40 gm.

Leafy Vegetables

The consumption of leafy vegetables wasfound to be very low in most of the districts with almost in-significant levels in Dharwar, Bidar, Chitradurga and Gulbarga districts. The Maximum consumption of leafy vegetables was seen in Dakshina Kannada Districts(450 gm) followed by Chickmagalur(280 gm) Bangalore(19 gm), Bijapur(18 gm), Bellary(15 gm) and Coorg(14 gm) The average consumption for all districts was 10 gms per C.U. perday, which is much below the recommended intake of 40 gm.

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Other Vegetables:

The average consumption of the other Vegetables was found tobe highest in Shimoga District(90 gms) followed by Dakshina Kannada(85 gms), Uttara Kannada (83 gms), Tumkur (80 gms) Chikmagalur (62 gms), Coorg (60 gms) and Belgaum (44 gms). The intake of other Vegetables was very low in Gulbarga (1.7 gms) and Bidar (5 gms). The average consumption for all the Districts was found to be 39 gms per C.U. perday. Whereas the recommended intake is 60 gms.

Roots and Tubers:

The average consumption of Roots and Tubers for all the Districts was found to be 30 gms per C.U. perday with maximum consumption in Coorg District (89 gms) followded by Gulbarga (47 gms), Dakshina Kannada (45 gms), Bijapur (45 gms) and Kolar (44 gms). Low intake was observed in Tumkur (15 gms), Raichur (16 gms), Hassan (16 gms) and Shimoga (17 gms). The recommended intake of Roots and Tubers is 50 gms per C.U. per-day.

Nuts and Oil Seeds:

The consumption of Nuts and Oil Seeds ~~is~~ was either insignificant or very low in most of the Districts. The average consumption was 12 gms per C.U. perday with maximum consumption in Uttara Karnataka (58 gms) followed by Dakshina Kannada (41 gms) and Coorg (28 gms). The intake was insignificant in Bidar, Gulbarga, Raichur and Dharwar Districts.

Condiments and Spices:

The average consumption of Condiments and Spices for all Districts was found to be 24 gms with maximum consumption in Bijapur (36 gms) followed by Bellary (35 gms), Shimoga (30 gms) Raichur (29 gms) and Dharwar (28 gms).

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Fruits:

The consumption of fruits was very low in most of the Districts with an average intake of 7 gms per C.U. perday for all Districts with maximum consumption in Bijapur (23 gms) followed by Coorg (20 gms). The intake was insignificant in Bidar, Gulbarga and Bangalore Districts.

Fish and Other Flesh Foods:

The consumption of Fish and other flesh foods was found to be insignificant in most of the Districts. The intake of fish was 23 gms in Coorg and 30 gms in Uttara Kannada. The other flesh foods consumption was observed as 13 gms in Coorg and 2.5 gms in Tumkur Districts.

Milk:

The highest milk consumption was observed in Bijapur (171 gms) followed by Belgaum (161 gms), Coorg (160 gms) Uttara Kannada (140 gms) and Bellary (125 gms). The low intakes of milk were observed in Chikmagalur (60 gms) Gulbarga (60 gms) and Bangalore (65 gms). The average consumption of milk was 97 gms per C.U. perday whereas the recommended intake is 150 gms per C.U. perday.

Fats and Oils:

The average consumption of fats and oils for all Districts was found to be 11 gms per C.U. perday with maximum consumption in Belgaum District (14.5 gms) followed by Coorg (14 gms) and Uttara Kannada (13 gms). The consumption was very low in Mandya (4 gms), Tumkur (6 gms) and, Dakshina Kannada (6 gms).

The recommended intake of fats and oils is 40 gms per C.U. perday.

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Sugar and Jaggery:

The average consumption of Sugar and Jaggery for all Districts was found to be 30 gms per C.U. perday, which is also the recommended intake under balanced Diet. The Maximum consumption was observed in Raichur District (53 gms) followed by Mysore District (52 gms), Belguam (39 gms), Chickmagalur (39 gms), Bijapur (38 gms) and Bellary (38 gms).

Intake of Nutrients

The average intake of different Nutrients per C.U. perday in different Districts is given in Table-2.

Energy: (K.cal)

The average energy consumption was found to be more than the recommended level of 2400 per C.U. perday in all the Districts except Dakshina Kannada (2059). The maximum consumption was observed in Bijapur (3425) followed by Raichur (3410) Dharwar (3323), Hassan (3176), Bellary (3141) and Gulbarga (3086). The average energy consumption for all the Districts was found to be 2870 K.cals.

Proteins: (Gms)

The mean proteins intakes was found to be above the RDA level of 55 gms in all the Districts except in Dakshina Kannada (46 gms). The pattern of consumption in different districts was similar to energy consumption. The average protein consumption for all the districts was 76 gms, per C.U. perday

Calcium (mg)

In general, the average Calcium intakes in all the districts were above the recommended level of 400 to 500 mg.

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The mean intake for all the districts was 985 mg with maximum Calcium consumption in Hassan (2109), followed by Tumkur (1940), Bangalore (1800), Mandya (1608), Kolar (1516) and Chitradurga (1277) districts. Ragi is the main staple food in these districts of maximum calcium intake. Ragi is rich in calcium.

Iron (mgs)

In all the districts the mean intake of dietary iron was found to be more than the recommended level of 24.0 mg per day. The maximum intake of 58 mg was found in Raichur District while the minimum of 27 mg was seen in Dakshina Kannada District. The average intake of iron for all the Districts was found to be 43 mgs per C.U. per day.

Vitamin "A" : (μg) (Retinol)

In general the intakes of Vitamin A were for below the recommended level (750 μg) in all the Districts. The lowest consumption was observed in Gulbarga District while the highest level was observed in Dakshina Kannada District (501 μg).

The mean intake of vitamin A for all the Districts was 292 μg per C.U. per day.

Thiamine : (mgs)

The highest mean intake of thiamine was observed in Bijapur District (3.3 mgs) and the lowest consumption level in Dakshina Kannada District (0.61 mgs). The mean intake of thiamine for all the Districts was 2.1 mgs per C.U. per day while the recommended level is 1.2 mgs.

Riboflavin: (mgs)

In all the Districts the intake of Riboflavin was below the recommended level of 1.4 mgs except in Hassan (1.46 mgs). The lowest intake of Riboflavin was observed in Dakshina Kannada District (0.7 mgs) and the mean intake of all the Districts was 1.16 mgs per C.U. perday.

Nicotinic Acid: (mgs)

The highest consumption of 25.4 mgs was seen in Raichur and Bijapur Districts followed by Dharwar (24.2 mgs), Gulbarga (24.2 mgs), Bellary (22.7 mgs), Bidar (21.9 mgs) and Belguam (19.6 mgs). The mean intake in rest of the Districts was below the R D A of 16.0 mgs.

The mean intake of Nicotinic acid of all the Districts was found to be 17.1 mgs.

Vitamin "C": (mgs)

The highest intake of Vitamin C was found in Dakshina Kannada District (69 mgs) followed by Coorg (53 mgs), Chickmagalur (46 mgs) and Bijapur (44 mgs), In the rest of the Districts the mean intake was less than the R D A of 40 mgs with lowest consumption in Bidar District (9 mgs). The mean intake for all the Districts was found to be 30 mgs per C.U. perday.

The Pattern of Nutrients Intake Per Day In Individuals

The consumption of different nutrients in different age, Sex and physiological Status groups is presented in table-3.

The mean intakes of Proteins, Calories, iron and Vitamin A are less than the recommended levels in the 1^+ age group. In the 2^+ age group the protein and iron intakes meet the requirements but calorie and Vitamin A intakes are below the recommended level. The same trend is also observed in 3^+,

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4-7 years, 7-10 years, 10-13 years and 13-16 years boys. In the age group of 13-16 years girls only Proteins intake meets therequirement. In 16-18 years boys and girls protein and iron intakes meet the requirements.

In Adult males both sedentary and moderate workers the protein, calories and iron intakes are meet the requirements whereas the intake of Vitamin A is much below the recommended level. The same trend is observed in adult females both sedentary and moderate workers and lactating sedentary females.

Pattern of Consumption In House Holds:

The pattern of dietary consumption in Households according to land Ownership, possession of milch cattle, major occupation according to crop raised and in harijan, tribal and other households are presented in tables 5 to 9.

It is evident that the mean consumption levels of both calories and proteins by the households who do not possess any land were found to be much less as compared to those who possessed land. The intakes increased in proportion to the increase in land Ownership.

The consumption of proteins and calories in those families who possessed cattle at home were higher as compared to those who ~~do~~ did not ~~possessed~~ possess any cattle.

The consumption levels of protein and calories in labourers families ~~was~~ were low as compared to the cultivator families. Those families which were catogorised under others were found to fall in between these two groups.

The consumption of proteins and calories in Harijan families was much lower than the rest of the community.

The consumption of protein and calories in households who have raised some crops was higher than those households who have not raised any crop.

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Thus the results of the different types of analysis clearly demonstrates that the consumption is primarily income dependent and any other parameter that is associated with income status of the household also would exhibit these differentials in the nutrient consumption patterns.

Protein Calorie adequacy :

Using data obtained through oral questionnaire method of diet Survey, which provide information on the consumption of nutrients by individuals in a family, individuals (belonging to all age groups) were classified into four different categories of adequacy and inadequacy of proteins and calories. Mean - 2 S D of the recommended levels (of corresponding age and sex) were used as cut off levels for adequacy of calories. The results are presented in Table 4.

The percent of individuals consuming inadequate calories and proteins within the families surveyed ranged from 2.7% in 4-13 years age group to 13.4% in Adult Lactating females. 12.3% of pre-school children (1-4 years) are consuming inadequate amounts of both proteins and calories. The overall percent of individuals consuming inadequate amounts of both proteins and calories was found to be 5.3%.

The overall percent of individuals consuming inadequate calories was more than those consuming inadequate amount of protein.

These data demonstrates that the problem of calorie inadequacy in different age groups is relatively of greater magnitude.

Prevalence of mal-nutrition in Pre-school Children by Weight for age Criterion.

Weight for age profile of pre-school children has often been used to assess the quantum of mal-nutrition in a community. Using the criterion (Gomez's classification), the children (1-5 years) surveyed were classified into four diffeent nutritional grades.

and their district wise distribution is provided in Table 10.

On the average about 82% of pre-school children were found to suffer from mild to moderate degree of mal-nutrition while about 7% were found to fall in the category of "severe" degree of mal-nutrition. The remaining 11% were found to have "normal" body weights for age (equal to or more than 90% of standard weight for age).

Among the districts, the severe degree of mal-nutrition was highest in Gulbarga District (12.7%) followed by Bellary (11%), Chitradurga (10%), Dharwar (8.5%) and Tumkur (7.5%). The severe degree of mal-nutrition was lowest in Uttara Kannada (3.3%) District.

The percent of Normal childrens was highest in Bijapur District (20%) followed by Uttara Kannada (17%), Coorg (163), Mandya (15.8%), Hassan (15.2") and Dakshina Kanada (14.2%).

In general, Uttara Kannada, Dakshina Kannada and Chickmagalure Districts have less mal-nutrition compared to other districts. Mal-nutrition was observed to be more in Gulbarga, Bellary and Chitradurga compared to other districts.

Dietary Intakes and Nutritional Status in Urban Population :

Bangalore and Mysore citie were selected for urban surveys. Diet and Nutrition Assessment Surveys were carried in different Socioeconomic groups like High Income Groups, (HIG), Middle Income Groups (MIG), Low Income Group (LIG), Industrial Labourers (IL) and Urban Slums (US) Population.

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Table 11 indicates the average intake of food Stuffs in different urban groups in Bangalore City.

It is observed that Cereals and Millets consumptions are higher in LIG and US groups compared to HIG, MIG and IL groups and a reverse observation is made for all other food stuffs. This indicates that higher income group population consume a diet nearer to a balanced diet, whereas food of slum population and Lower Income group is mainly Cereal and Millet based with a poor intake of other food Staffs.

Table 12 indicates the average intake of Nutrients in different Socioeconomic groups in urban population. It is observed that intakes of all the Nutrients is higher in MIG and LIG population compared to IL and Slum population. Calorie Intakes in IL and Slum population did not meet the requirement.

Table 13 indicates the percentage distribution of 1-5 years children according to Gomez classification of Malnutrition among different Income groups in Bangalore.

It was observed that Severe degree of malnutrition is almost insignificant in MIG, LIG and IL groups while it is high in the order of 10.5% in urban Slum group. The percent of normal children is also very low in the order of 9.4% in the Slum groups compared to other groups.

Even compared to rural Karnataka Children, the Severe malnutrition in urban Slum Children is higher.

Prevalance of Nutrition deficiency Signs among preschool children in different urban Socioeconomic groups is presented in Table No. 14.

P.E.M. in 2%, Vitamin A dificiency in 7.5% and B complex deficiency in 16.1% of pre school children was observed in urban slum population.

(Table - 15)

Trends in the prevalence of Mal-nutrition in Karnataka.

During the second round of Nutrition Surveys started in 1988, it has been found that the severe degree of Mal-nutrition in Tumkur District was 2.17% compared to 7.5% in 1974-80 period, in North Kanara district, Nil compared to 3.3% and in Gulbarga District 5.8% compared to 12.7% earlier. Correspondingly the percentage of normal children also increased in all the three districts in 1988 compared to 1974-80 surveys.

Thus in general this indicates the declining trends in the prevalence of Mal-nutrition in the three districts.

CONCLUSIONS: !

1. Jowar in North Karnataka, Ragi in Central and South Karnataka and Rice in Coastal and Malnad districts, form the staple food in Karnataka.

2. In general, in the Jowar and Ragi consuming areas, the per consumption unit Millet intakes and thereby calorie and protein intakes are high, but consumption of other Food Stuffs is low. In the Rice consuming areas of Malnad districts the average cereal intakes and thereby calorie and protein intakes are lower, but intake of other food stuffs like leafy vegetables, Milk and Flesh foods are significant.

Thus in Malnad districts, the diets are more balanced especially in Dakshina Kannada than the Maidan areas.

3. Among the individual intakes of different age groups, the children especially of pre-school age are not getting the required amounts of calories, Vitamin A and Iron, though adults are meeting the requirements. Thus, in the intrafamilial distribution of food, children are

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getting less ~~quality~~ quantity of foods compared to the ~~Recommended~~ Recommended allowance.

4. Severe degree of Mal-nutrition (wasting) is more in the dry areas of Gulbarga, ~~Bijapur~~ Bellary and ~~Raichur~~ Chitradurga districts and low in the Malnad and Coastal districts. Gulbarga had highest prevalence (12%) and Uttara Kannada the lowest (3%).

5. The overall percent of individuals consuming inadequate calorie was more than those consuming inadequate amount of protein according to the information on the consumption of nutrients by individuals in a family. The data demonstrated that the problem of calories inadequacy is relatively of greater magnitude than that of protein.

6. The results of the different types of analysis e.g. according to Land ownership, possession of cattle, crops raised, occupation etc; clearly demonstrate that the consumption is primarily income dependent and any other parameter that is associated with income status of the household also would exhibit these differentials in the nutrient consumption patterns.

TABLE - I

NNMB-Rural-Average intake of Food Stuff (g/Cu/day) 1976-80

DISTRICT	CEREALS AND MILLETS	PULSES	LEAFY VEGET ABLES	OTHER VEGET ABLES	ROOTS & TUBERS	NUTS & OIL SEEDS	CONDIMENTS & SPICES	FRUITS	FISH	OTHER FLESH FOODS	MILK	FATS AND OILS	SUGAR AND JAGGERY
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Bangalore	653	57	19	12	20	8	25	-	-	-	65	7	25
Belgaum	642	43	7.7	44.2	28.4	1.2	18.7	5.7	0	0.3	161	14.6	39.2
Bellary	739	43	15	36	18	2	35	12	-	-	125	7	38
Bidar	640	85	1	5	21	-	21	-	-	-	72	7	13
Bijapur	780	45	18	41	45	3	36	23	3	-	171	12	38
Chikmagalur	582	46	28	62	31	20	22	6	--	-	58	8	39
Chitradurga	620	46	1.7	23	20.2	4.5	25	2.9	0	0	94	6.8	36
Coorg	515	38.8	14.1	59.4	89.2	28.4	22.1	20.5	23.6	13.6	159.9	13.9	37.8.
Dakshina Kannada	418	17	45	85	45	41	14	6	8	-	82	6	24
Dharwar	778	68	-	31	22	-	28	5	2	2	104	7	33
Gulbarga	714	92	0.2	1.7	47.2	-	18.5	-	-	-	60	9.3	22.4
Hassan	763	62.8	4.5	18.5	16.7	21.5	20.5	7.1	-	-	105	6.6	27.7
Kolar	675	52	10	21	44	2	25	13	-	1	77	6	18
Mandya	663	60	12	15	19	9	24	8	-	-	73	4	27
Mysore	630	57.3	2.0	29.5	24	12.5	28.2	3.8	-	0.8	66.8	7.3	52.2
Raichur	767	88.0	3.0	12.0	16	-	29	12	-	-	90	8	53
Shimoga	621	28	4	90	17	15	30	6	-	-	112	9	31
Tumkur	656	32	8.9	80	15	15	22	4.5	-	2.5	80	6	27
U. Kannada	592	32.5	3.5	83	28.5	58.3	15.3	2.4	30	-	149	13	33
Mean Consumption	655	52.3	10.4	39.4	29.8	12.7	24.1	7.2	3.5	1.0	96.7	11.4	29.9
RDA	460	40	40	40	60	50					150	40	30

TABLE - II

NNMB - Rural Average intake of Nutrients (Cu/day) 1976-80

DISTRICTS	PROTEINS (Gms)	CALORIES	CALCIUM (Mgs)	IRON (Mgs)	VITAMIN 'A' RETINOL (µg)	THIANINE (Mgs)	RIBO FLAVIN (Mgs)	NICOTINIC ACID (Mgs)	VITAMIN 'C' (Mgs)
1	2	3	4	5	6	7	8	9	10
Bangalore	69.7	2,704	1,800,0	48.6	341.0	2.60	1.32	12.5	23.0
Belgaum	81.0	2,880	598	39.8	293.0	2.35	1.23	19.61	28.9
Bellary	90.8	3,141	757	53.0	391.0	2.71	1.32	22.7	33.0
Bidar	88.4	2,760	421.0	43.3	200.0	2.64	1.11	21.9	9.0
Bijapur	104.9	3,425	751.0	55.1	486.0	3.30	1.60	25.4	44.0
Chikmagalur	65.3	2,630	691.0	40.4	403.0	1.59	0.92	15.3	46.0
Chitradurga	68.1	2,630	1,277.0	43.6	206.7	2.29	1.16	14.1.0	16.8
Coorg	65.4	2,670	759.5	31.5	362.9	0.83	0.87	14.1.7	53.4
Dakshina Kannada	46.0	2,059	503.0	27.4	501.0	0.61	0.70	10.8	69.0
Dharwar	97.4	3,323	599.0	51.5	232.0	2.8	1.2	24.2	19.0
Gulbarga	96.6	3,086	461.4	47.9	187.7	2.94	1.19	24.2	9.9
Hassan	77.2	3,176	2,109.0	51.4	238.1	2.58	1.46	12.8	18.0
Kolar	68.9	2,779	1,516.0	42.7	272.0	2.17	1.19	13.5	28.0
Mandya	67.3	2,749	1,608.0	44.1	273.0	2.10	1.20	11.8	22.0
Mysore	73.2	2,817	1,127.3	46.7	210.1	2.28	1.17	15.9	19.7
Raichur	102.3	3,410	576.0	58.2	263.0	3.0	1.33	25.4	17.0

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1	2	3	4	5	6	7	8	9	10
Shimoga	65.1	2,720	603.0	35.0	237.0	1.37	0.91	15.7	39.0
Tumkur	63.6	2,684	1,940.0	46.6	267.1	2.45	1.3	11.45	37.0
Uttara Kannada	67.7	2,877	637.3	29.9	199.9	0.98	0.89	15.37	36.3
Mean intake	76	2,869	985	43.6	292	2.1	1.16	17.1	29.9
R.D.A.	55	2,400	400-500 Mg	24 Mg	750 Mg	1.2	1.4	16	40

TABLE 3

AGE GROUPS	NO. COVERED	Protetn(g) MEAN	S.D.	Calories(Kcal) MEAN	S.D.	Iron(mg) MEAN	S.D.	Vitamin-A (ug) MEAN	SD.
01 + Year	42	15.2	12.25	595	412	8.4	7.28	63	61.7
02 Years	69	28.9	13.44	1005	429	15.5	8.42	169	239.7
03 Years	83	30.4	14.78	1089	444	17.9	8.61	152	175.2
4-7 Years	229	38.8	17.14	1398	534	23.3	11.04	159	153.3
7-10 Years	206	46.4	21.59	1694	667	27.8	14.40	171	195.5
10-13 Years	138	53.3	24.86	1928	687	32.0	15.63	221	277.0
13-16 Years Boys.	33	64.3	24.53	2274	764	37.5	17.98	258	377.9
13-16 Years Girls.	45	54.3	23.94	2056	721	22.7	14.57	156	151.9
16-18 Years Boys.	25	66.0	26.21	2362	703	39.0	15.43	222	169.6
16-18 Years Girls.	17	56.4	16.59	2131	433	34.2	11.49	271	254.2
ADULT-MALES SEOENTARY	143	71.4	29.48	2676	948	42.0	19.32	252	251.1
ADULT - MALES MODERATE	216	75.9	36.00	2788	1081	46.3	21.69	240	253.3
ADULT - FEMALES SEDENTARY	301	63.6	32.90	2333	892	37.2	18.07	225	255.1
ADULT - FEMALES MODERATE	38	72.0	35.09	2439	862	44.1	19.45	327	393.6
LACTATING FEMALES SEDENTARY	80	67.8	32.61	2422	965	39.2	17.66	235	215.1

TABLE 4

PROTEIN CALORIE ADEQUCY - NNMB - RURAL - KARNATAKA
Percent of Individuals

AGE GROUPS	N	P.C - -	P C - +	P C + -	P C + +
1 - 4 Years	269	12.3	--	36.4	51.3
4 - 13 Years	786	2.7	--	26.6	70.0
13 - 18 Years	159	8.8	--	18.2	73.0
ADULE - MALE	608	4.3	0.3	14.5	80.9
ADULE - FEMALE	460	3.9	0.2	6.5	89.3
ADULT - FEMALE	112	13.4	-	21.4	65.2
TOTAL INDIVIDUALS	2394	5.3	0.1	20.0	74.6

TABLE 5

CALORIE AND PROTEIN INTAKE ACCORDING TO LAND OWNERSHIP

LAND IN ACRES	NO.	PROTEINS		CALORIES	
		MEAN	SD	MEAN	SD
No. Land	302	63.3	± 24.61	2312	± 732
L 5 Acres	410	65.3	± 20.07	2576	± 685
5 -10 Acres	181	76.3	± 20.60	2860	± 683
7/10 Acres	231	86.5	± 24.82	3099	± 756

PER CONSUMPTION UNIT PER DAY

TABLE - 6

CALORIE AND PROTEIN INTAKE ACCORDING TO POSSESSION OF MILCH/NON MILCH CATTLE AT HOME

GROUP	NO.	PROTEINS MEAN	PROTEINS SD	CALORIES MEAN	CALORIES S.D.
No. Cattle at Home	387	64.8	± 24.01	2398	± 751
Milch/Non Milch Cattle at Home	737	74.1	± 22.04	2721	± 739

+ PER CONSUMTPION UNIT PER DAY

TABLE - 7

CALORIE AND PROTEIN INTAKE BY MAJOR OCCUPATION

GROUP	NO.	PROTEINS MEAN	PROTEINS S.D.	CALORIES MEAN	CALORIES S.D.
Labourers	324	63.2	± 24.08	2338	± 750
Cultivators	557	77.0	± 23.75	2901	± 739
Others	243	67.0	± 21.54	2526	± 684

+ PER CONSUMPTION UNIT PER DAY.

TABLE - 8

CALORIE AND PROTEIN INTAKE FOR HARIAN, TRIBES & OTHERS

GROUPS	NO.	PROTEINS MEAN	PROTEINS S.D.	CALORIES MEAN	CALORIES S.D.
Harijans	209	65.2	± 25.50	2343	± 727
Tribes	17	70.3	± 26.66	2435	± 715
Others	898	72.2	± 23.65	2736	± 757

+ PER CONSUMPTION UNIT PER DAY

TABLE - 9

CALORIE AND PROTEIN INTAKE ACCORDING TO CROP RAISED

GROUPS	NO.	PROTEINS		CALORIES	
		MEAN	S.D.	*MEAN	S.D.
No Crop raised	306	63.5	± 24.45	2315	± 730
Some crop raised	818	73.6	± 23.52	2786	± 740

* PER CONSUMPTION UNIT PER DAY

TABLE - 10

NNMB (RURAL) : DISTRIBUTION OF MAL-NUTRITION IN PRE-SCHOOL CHILDREN (1-5)

BY GOMEZ GRADES-KARNATAKA

DISTRICT	NO. OF CHILDREN	NORMALS	MILD	MODERATE	SEVERE
Bangalore	277	8.66	44.77	39.71	6.86
Belgaum	284	9.86	45.78	38.73	5.63
Bellary	128	3.90	44.53	40.63	10.94
Bidar	283	11.66	37.10	44.17	7.07
Bijapur	100	20.00	35.00	38.90	7.00
Chikkamagalur	276	12.32	47.83	35.87	3.99
Chitradurga	159	9.44	33.96	46.54	10.06
Coorg	62	16.13	40.32	37.10	6.45
Uttara Kannada	211	17.06	44.08	35.54	3.32
Dharwar	343	13.12	39.07	39.36	8.45
Gulbarga	307	6.51	38.76	42.02	12.70
Hassan	289	15.22	48.10	33.22	3.46
Kolar	97	9.28	55.67	27.83	7.22
Mandya	171	15.79	52.63	27.49	4.09
Mysore	279	13.62	45.52	36.56	4.30
Raichur	105	8.57	41.90	42.86	6.67
Shimoga	144	9.72	48.61	36.11	5.56
Tumkur	320	7.19	49.06	36.25	7.50
Dakshina Kannada	126	14.28	42.86	38.10	4.76
Pooled	3961	11.4	44.0	37.9	6.6

TABLE - 11

AVERAGE INTAKE OF FOOD STUFFS (Gms/Cu/day) IN DIFFERENT URBAN GROUPS IN BANGALORE CITY

FOOD STUFFS IN Gms.	HIGH INCOME GR.	MIDDLE INCOME GROUP	LOW INCOME GR.	INDUSTRIAL LABOURERS	URBAN SLUMS
Cereals & Millets	477	437	557	406	519
Pulses	70	58	51	48	45
Leafy vegetables	40	22	18	22	15
ther vegetables	73	69	51	59	44
Roots and Tubers	83	68	53	62	44
Nuts and Oil seeds	29	35	14	21	8
Condiments & Spices	26	17	18	17	23
Fruits	45	71	42	43	35
Fish	11	3	0	4	2
Other flesh foods	18	11	8	7	5
Milk	288	306	112	172	42
Fats & Oils	31	32	17	25	10
Sugar & Jaggery	40	37	37	32	21

TABLE - 12

AVERAGE NUTRIENTS INTAKE (Cu/day) IN DIFFERENT GROUPS IN BANGALORE CITY

	MIDDLE INCOME GROUP	LOW INCOME GROUP	INDUSTRIAL LABOURERS	URBAN SLUMS
No. of Households Nutrients	114	115	115	109
Protein in Grams	69.7	64.7	56.9	55.5
Calories in Kcol	2715	2468	2291	2287
Calcium in Mg.	1022	1053	695	993
Iron in Mg.	29.8	34.9	25.9	33.1
Vit-'A' Retinolin Mg	537	366	435	297
Thiamine in Mg.	1.47	1.69	1.14	1.46
Riboflayin in Mg.	1.31	1.09	0.96	0.88
Niacin in Mg.	15.1	14.5	13.1	11.8
Vitamin 'C' in Mg	60	50	55	36

TABLE - 13

PERCENTAGE DISTRIBUTION OF 1-5 YEARS CHILDREN ACCORDING TO GOMEZ CLASSIFICATION AMONG DIFFERENT INCOME GROUPS IN BANGALORE

INCOME GROUP	NUMBER SURVEYED	WEIGHTS AS PERCENTAGE OF STANDARD			
		790 NORMAL	75-90 MILD	60-75 MODERATE	60 SEVERE
Middle income	139	41.0	45.3	13.7	0.0
Low income	164	21.3	49.4	28.7	0.6
Industrial Labour	139	35.3	43.2	20.8	0.7
Urban Slum	256	9.4	42.6	37.5	10.5

TABLE - 14

PERCENT PREVALENCE OF DEFICIENCY SIGNS AMONG PRE-SCHOOL CHILDREN OF DIFFERENT INCOME GROUP IN BANGALORE

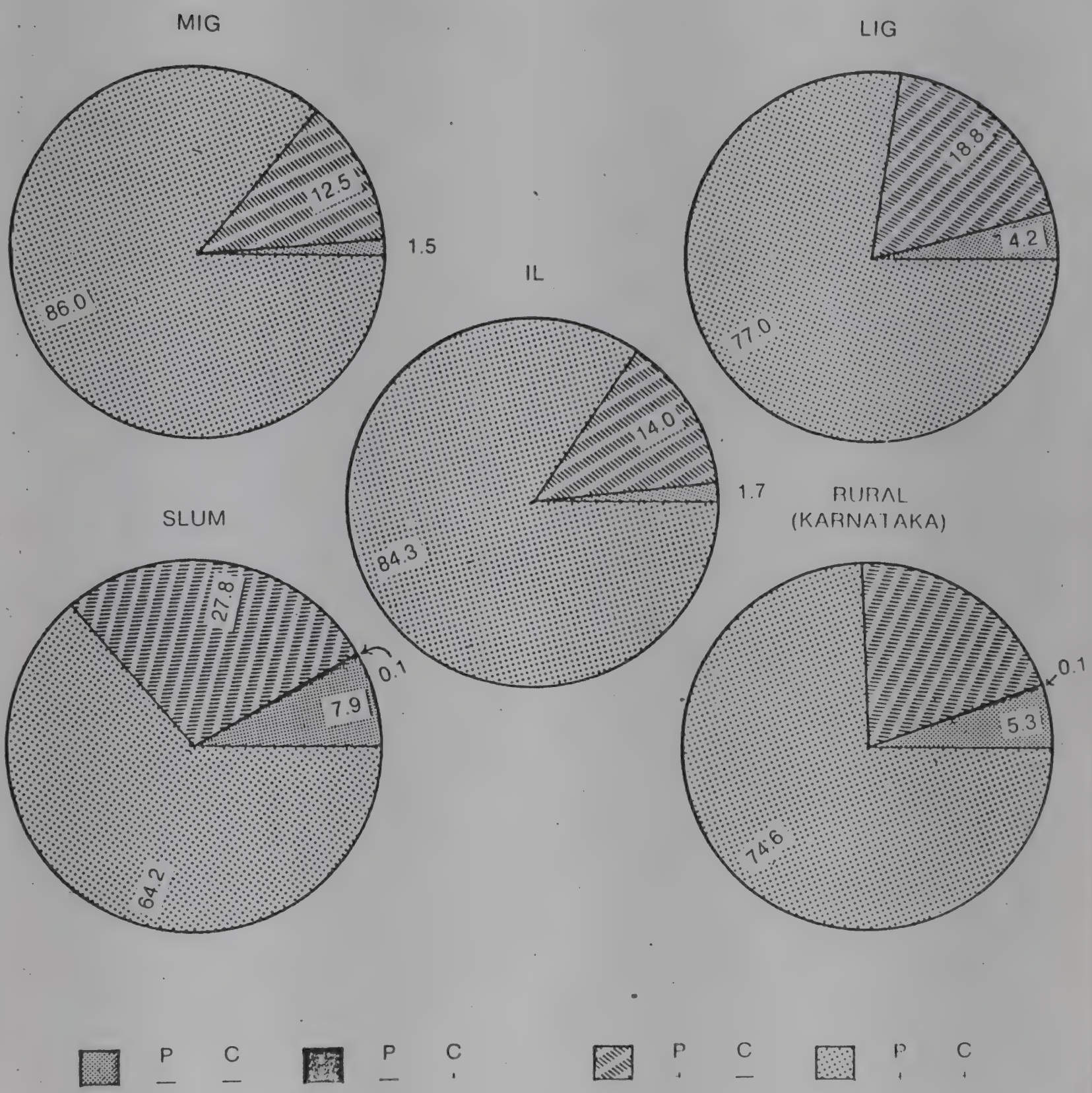
	MIDDLE INCOME GROUP	LOW INCOME GROUP	INDUSTRIAL LABOURERS	URBAN SLUMS
Number	138	164	138	255
Deficiency signs				
NAD	90.6	81.7	89.1	64.7
Oedema	-	-	-	1.2
Emaciation	0.7	0.6	-	2.4
Marasmus	-	-	-	0.8
Twoor more signs of PCM	-	-	-	2.0
Conj. Xerosis	-	-	0.7	0.4
Bitot's spot	-	1.8	0.7	7.1
Total Vit-'A' Deficiency	-	1.8	1.4	7.5
Angular stomatitis	4.4	7.9	1.5	16.1
Other B-complex deficiency	-	-	-	-
Total B-complex deficiency	4.4	7.9	1.5	16.1
Caries	3.6	3.1	4.4	0.4

TABLE - 15

NNMB-(Rural) Trends in the Distribution of Pre-School children (1-5) by Gamez grades of Mal-nutrition - Karnataka

	1974-80	Percentage of				1988	Percentage of			
	Total No. of children	Normals	Mild	Moderate	Severe	Total No.of Children	Normals	Mild	Moderate	Severe
Tumkur	320	7.19	49.06	36.25	7.50	184	11.95	53.80	32.06	2.17
North Kanara	211	17.06	44.08	35.54	3.32	79	15.18	53.16	31.64	-
Gulbarga	307	6.51	38.76	42.02	12.70	205	9.75	45.85	38.53	5.85

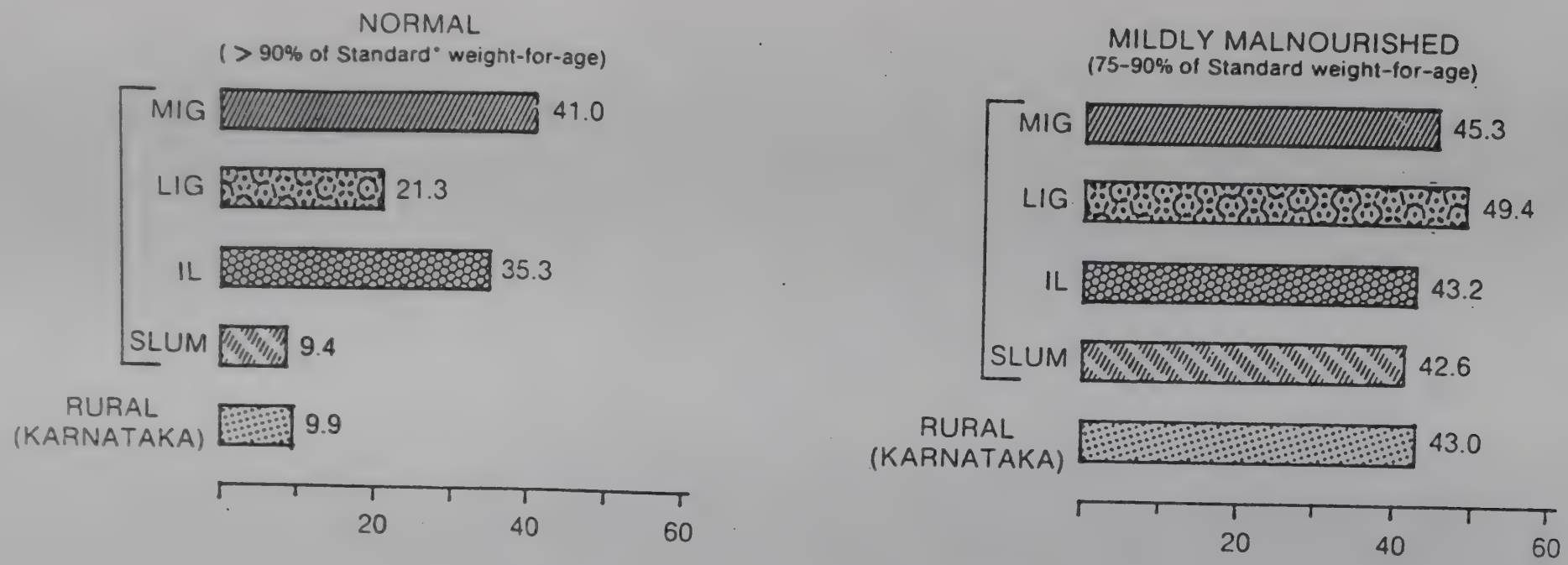
CALORIE PROTEIN INTAKE STATUS OF INDIVIDUALS (PERCENTAGE) FROM DIFFERENT SOCIO-ECONOMIC GROUPS IN BANGALORE (KARNATAKA)
(Source: NNMB Surveys, 1975-80)



MIG : MIDDLE INCOME GROUP LIG : LOW INCOME GROUP IL : INDUSTRIAL LABOURERS

Number of Individuals Surveyed in High Income Group (HIG) was small for Analysis

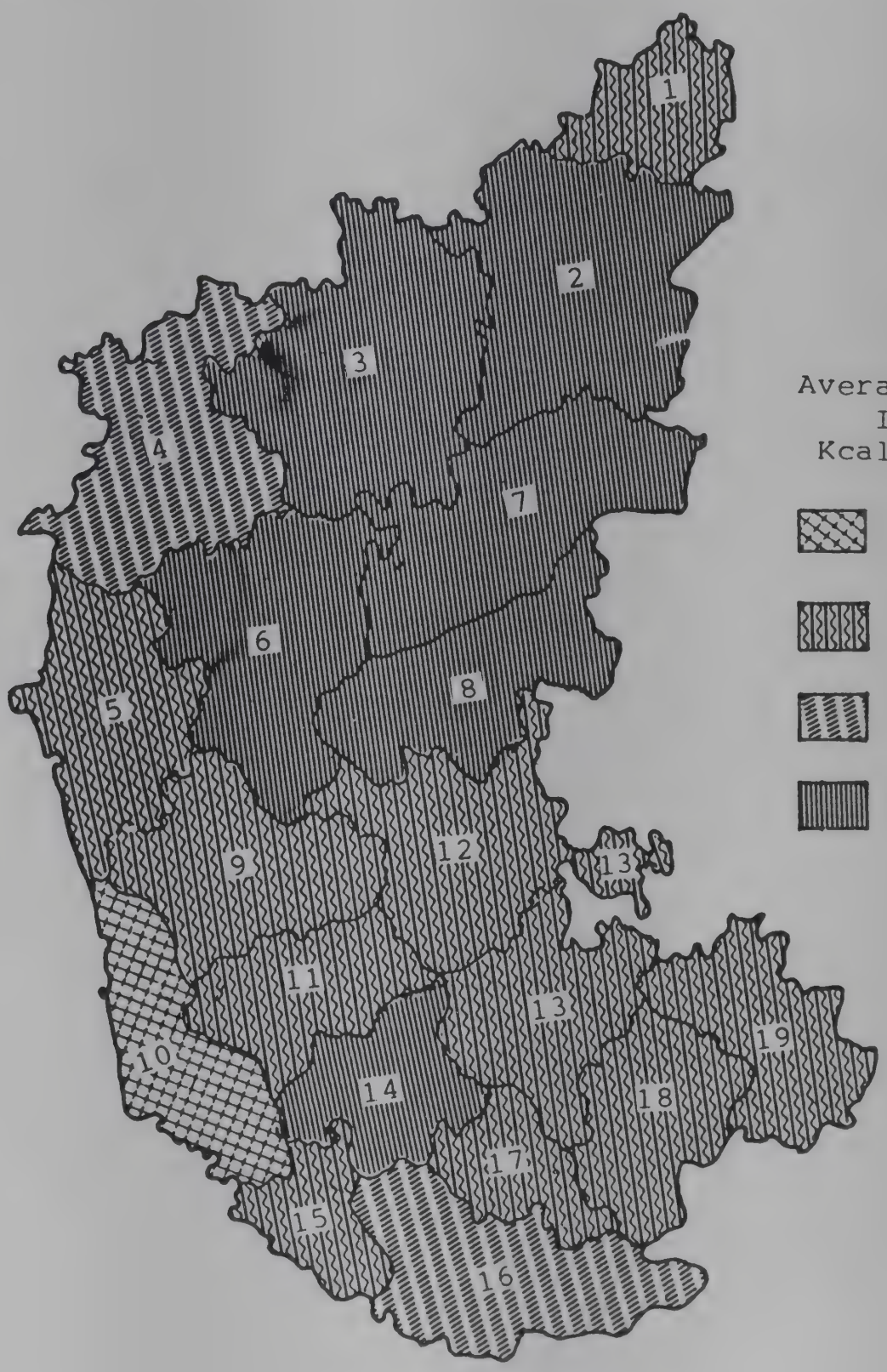
PERCENTAGE DISTRIBUTION OF CHILDREN (1-5 YRS) IN BANGALORE (KARNATAKA) ACCORDING TO GRADES OF MALNUTRITION
(Source: NNMB Surveys, 1975-80)



MIG : MIDDLE INCOME GROUP LIG : LOW INCOME GROUP IL : INDUSTRIAL LABOURERS

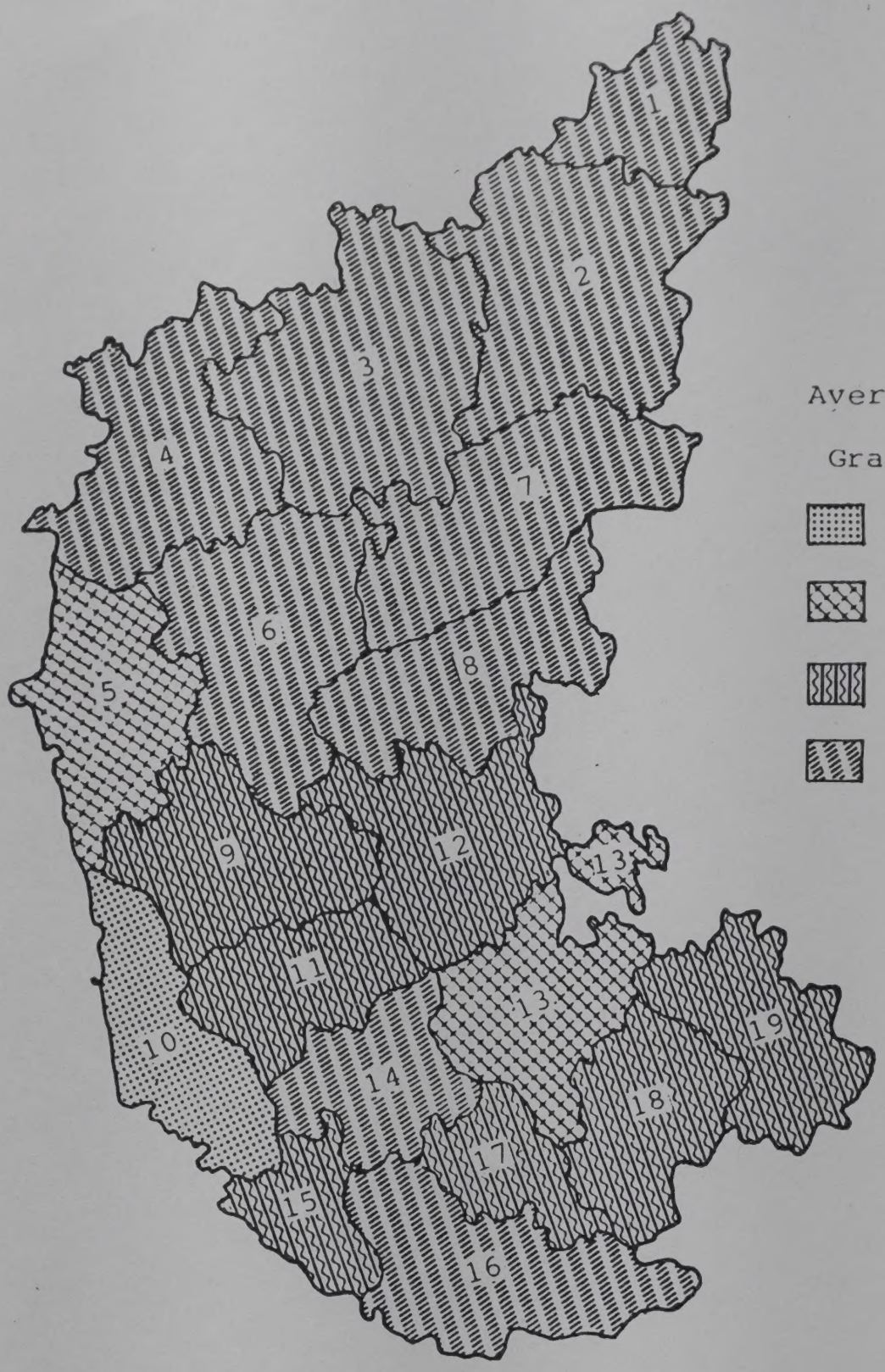
Number of Children surveyed in High Income Group (HIG) was small for Analysis
* Standard : Well-to-Do Indian Children

CONSUMPTION OF CALORIES - RURAL KARNATAKA
(Source: NNMB Reports, 1975-1981, NIN)



1. Bidar 2. Gulbarga 3. Bijapur 4. Belgaum 5. North Kanara
6. Dharwar 7. Raichur 8. Bellary 9. Shimoga 10.South Kanara
11.Chikmagalur 12.Chitradurga 13.Tumkur 14.Hassan 15.Coorg
16.Mysore 17.Mandya 18.Bangalore 19.Kolar

CONSUMPTION OF PROTEINS - RURAL KARNATAKA
(Source: NNMB Reports, 1975-1981, NIN)



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16. Mysore 17. Mandya 18. Bangalore 19. Kolar